

REMARKS

The Office Action mailed June 14, 2004, has been received and reviewed. Claims 23-26, 29-31, and 34-44 are currently pending in the application. Claims 23-26, 29-31, and 34-44 stand rejected. Applicants have amended claims 23-26, 29-31, and 34-42 and respectfully request reconsideration of the application as amended herein.

Claims 23-26 have been amended to recite that the gate stack is operable. Support for these amendments is described below in the 35 U.S.C. § 112, first paragraph rejections.

Claims 23, 24, and 29-31 have been amended to replace the transitional phrase “including” or “includes” with the transitional phrase “comprising” or “comprises.” Since “comprising” and “including” are synonymous, this amendment does not add new matter to the claims. M.P.E.P. § 2111.03.

Claim 42 has been amended to improve antecedent basis and to correct dependency.

Claims 23-26 and 34-41 have been amended to improve antecedent basis.

35 U.S.C. § 112 Claim Rejections

Claims 23-26, 29-31, and 34-44 stand rejected under 35 U.S.C. § 112, first paragraph, as allegedly containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicants respectfully traverse this rejection, as hereinafter set forth.

“To satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention.” M.P.E.P. § 2163. “While there is no *in haec verba* requirement, newly amended claim limitations must be supported in the specification through express, implicit, or inherent disclosure.” *Id.* “When an explicit limitation in a claim ‘is not present in the written description . . . it must be shown that a person of ordinary skill would have understood, at the time the patent application was filed, that the description requires that limitation.’” *Id.*

The Examiner states that “[a]n operable transistor requires to have a gate, a source, and a

drain. [sic] However, the present invention only discloses the techniques to etch a stack of layers to form a gate stack. Since this gate stack is an intermediate structure of a transistor, it is not operable.” Office Action of June 14, 2004, p. 2. Since the Examiner has not specifically identified the subject matter in the pending claims that is asserted to not comply with the written description requirement, Applicants assume, based on the Examiner’s statement, that the rejection is due to the term “operable.” If this assumption is incorrect, Applicants respectfully request further clarification of the nature of the rejection in a subsequent Office Action.

As amended, each of independent claims 23-26 is directed to a gate stack and recites, *inter alia*, that the gate stack is operable. Independent claim 29 is directed to a semiconductor device and recites, *inter alia*, that the semiconductor device comprises at least one operable gate stack. Independent claim 31 is directed to a semiconductor device and recites, *inter alia*, that the semiconductor device comprises at least one operable gate stack structure. Contrary to the Examiner’s implication, the pending claims are not directed to an operable transistor. Therefore, Applicants are unclear with respect to the relevance of the Examiner’s statement on p.2 of the Office Action of June 14, 2004, that an operable transistor requires a gate, a source, and a drain and that the gate stack is an intermediate structure of a transistor.

Applicants acknowledge that the as-filed specification does not disclose *in haec verba* that the gate stack is operable. However, Applicants respectfully submit that a person of ordinary skill in the art would have understood, at the time the patent application was filed, that the gate stack of the claimed invention is operable. The as-filed specification discloses forming a gate stack. See p. 4, lines 21-29. To form the gate stack, a gate dielectric layer is formed on a silicon substrate. *Id.* A polysilicon layer is formed on the gate dielectric layer and a non-annealed metallic silicide film is deposited on the polysilicon layer. *Id.* Since the metallic silicide film is not annealed, the metallic silicide film is non-crystalline or amorphous. *Id.* at p. 6, line 26 through p. 7, line 1. As such, the gate stack includes a non-crystalline metallic silicide film. The as-filed specification also discloses that “it has been found that . . . the metallic silicide film has sufficiently low resistivity without annealing.” *Id.* at p. 6, lines 5-8. Since gate stacks utilize a metal silicide having a low resistivity (see *Id.* at p. 2, lines 16-22) and since the gate stack of the claimed invention has a low resistivity, a person of ordinary skill would understand that the gate

stack of the claimed invention is operable.

The as-filed specification also discloses that the gate stack of the claimed invention prevents growth of silicon clusters in the metallic silicide film, which eliminates pitting on the gate dielectric layer during the etching of the gate stack. *Id.* at p. 6, lines 3-12. The as-filed specification makes clear that the gate stack of the claimed invention, which comprises the non-crystalline or amorphous metallic silicide layer, is an alternative to the gate stack of the prior art to eliminate the problem of pitting. *Id.*

In contrast to the present invention, the gate stack of the prior art includes an annealed metallic silicide film that is crystalline. *Id.* at p. 3, lines 5-17 and at p. 5, lines 10-13. During subsequent etching of the gate stack of the prior art, pitting undesirably occurs on the gate dielectric layer. *Id.* at p. 5, lines 24-26.

Since the as-filed specification makes clear that the gate stack of the claimed invention has the desired properties of an operable gate stack, a person of ordinary skill would understand that the gate stack of the claimed invention is operable.

The Examiner's statement also appears to imply that the gate stack is not operable because the claims do not recite other elements of a transistor. Office Action of June 14, 2004, p. 2. However, as discussed above, the independent claims are not directed to a transistor. Furthermore, each of independent claims 23-26 recites that the gate stack comprises "a non-crystalline metallic silicide film" or "an amorphous metallic silicide film" and that "the gate stack is operable." Similarly, each of independent claims 29 and 31 recites a semiconductor device "comprising at least one operable gate stack." Since these claims use the open-ended transitional phrase "comprising," these claims do not exclude additional unrecited elements. M.P.E.P. § 2111.03.

Since a person of ordinary skill would have understood, at the time the patent application was filed, that the gate stack of the claimed invention is operable, Applicants respectfully submit that the rejection of claims 23-26, 29-31, and 34-44 is improper and should be withdrawn.

ENTRY OF AMENDMENTS

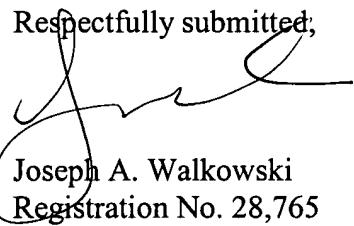
The amendments to claims 23-26, 29-31, and 34-42 above should be entered by the

- Examiner because the amendments are supported by the as-filed specification and drawings and do not add new matter to the application.

CONCLUSION

Claims 23-26, 29-31, and 34-44 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,



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